EUR 7262 EN

COMMISSION OF THE EUROPEAN COMMUNITIES

Multiannual Programme of the Joint Research Centre 1980-1983

1980 Annual Status Report

Utilization of research results

JOINTRESEARCHCENTREJOINTRESEARCHCENTREJOINTRESEARCHCENTREJOINTRESEARCHCENTREJOINTRESEARCHCENTRE

EUR 7262 EN

COMMISSION OF THE EUROPEAN COMMUNITIES

**Multiannual Programme
of the Joint Research Centre
1980-1983**

1980
Annual Status Report

Utilization of research results

Published by the
COMMISSION OF THE EUROPEAN COMMUNITIES

Directorate-General
Scientific and Technical Information
and Information Management

Bâtiment Jean Monnet
LUXEMBOURG

Reproduction in whole or in part of the
contents of this publication is free, provided
the source is acknowledged

© ECSC-EAEC, Brussels-Luxembourg, 1981

Printed in Italy

ISBN 92-825-2351-9
Catalogue number: CD-NE-81-016-EN-C

UTILISATION OF RESEARCH RESULTS

1980

Research Staff (n°): 1 (*)
Budget: 328,000 ECU

Projects:
- Support to patent affairs
- Further development of inventions
- Support to licensees
- General information

Programme Manager: V. LUNGAGNANI
Commission of the European Communities
Joint Research Centre
Ispra Establishment
I-21020 Ispra (Varese), Italy

1. INTRODUCTION

The word "utilisation" is used in the title of this programme with limited meaning of "short-term exploitation" (by industries, commercial organisations, etc.) of the JRC research; the basic concept of this programme is to provide added value to research results as part of the innovation process.
While work is in progress towards the achievement of the JRC programme objectives, it may appear that some of the intermediate results are of direct use in a variety of immediate applications.

According to the Euratom Treaty, persons and organizations of Member States have the right to obtain non-exclusive licences on patents and know-how owned by the Community, where they are able to make effective use of the inventions resulting from the execution of research programmes.

The operative machinery dealing with technical and legal aspects of this technology transfer process is under the responsibility of the Directorate General XIII - Direction A "New technologies".

Over the past years, several licence agreements have been signed covering a large spectrum of inventions: some 30 of such licence contracts are still on force.

(*) Covers coordination only.

At present about 50 inventions (patents or know-how) constitute the JRC potential portfolio in terms of technology transfer. This is the result of a process of selection made on the basis of specific technical and market criteria among several hundreds inventions JRC made since the origin.

It is important to consider that the opportunity for exploitation is in general becoming apparent when a relevant time (usual 3-5 years) is elapsed from the invention, and when the original project (in some cases the original programme) is terminated. This programme provides means for the exploitation of such inventions.

The hypothesis governing this programme if that an R&D environment (scientists and research managers) can more effectively direct efforts towards use in new and improved products (materials, processes, instruments, etc.) by means of a more attentive screening of current activities and by means of appropriate investments on innovative persons and laboratories.

2. RESULTS

Support to patent affairs

During the reporting period some ten patents were applied, covering areas such as:

— heat exchangers for solar gas turbines
— super-plastic alloys
— passive downwards heat transport
— welding procedures
— electronic sensors
— hydrogen production
— biomass pyrolisis
— water pollution
— sea-temperature sensor
— photochemical dissociation

Experimental and theoretical work was requested to several inventors in order to provide adequate exemplification of the various aspects of the patent proposals.

The following patents emanating from the JRC were filled by Euratom in 1980:

Patent n.	Date	Title
8001578	17.1.80	Reprocessing of spent plasma
82139	5.2.80	Elément de paroi solaire pour bâtiments
8015401	9.5.80	Apparatus for continuous and direct measurement of the sea surface temperature
80200457.2	14.5.80	Verfahren zur gleichzeitigen Herstellung von Wasserstoff und Schwefelsäure oder Sulfaten aus Schwefel und Wasser
P3026164.4	8.7.80	Verfahren und Vorrichtung zur entladungschemischen Behandlung empfindlicher Werkstüke durch Einsatz der Glimmentladung
8003969	9.7.80	Elektrisch geleidend glas
8025348	4.8.80	Apparatus and method for measuring the toxicity of polluants to aquatic living organisms
8025792	7.8.80	Device for passive downwards heat transport and integrated solar collector incorporating same
P3032013.9	25.8.80	Sekundärelektronendetektor zur Analyse bestrahlter Proben für Elektronenrastermikroskope und Mikrosonden
8005645	13.10.80	Werkwijze voor het omkeerbaar opsluiten van gassen of dampen in een natuurlijk of synthetisch zeoliet
82850	15.10.80	Verfahren zur Herstellung dünner Schichten

Further development of inventions and support to licensees

Efforts devoted to the dissemination and exploitation of research results (development of prototypes, demonstration projects, feasibility contracts) concerned a variety of materials, processes, methods and instruments.

Once a licence agreement is reached with an industrial partner, it becomes, in general apparent that various initiatives (advices, experiments, proof tests, etc.) should take place in order to bridge the gap between the research laboratory and the successful exploitation of the invention on the market. Three new licence agreements were signed in 1980 (in the field of electroerosion, tribometry and non-radioactive alloys) and support was provided to several licensees.

Visualisation of ultrasonic beams, using liquid crystals

As a follow up of research activities performed by the "Non Destructive Testing Lab" of JRC Ispra, a laboratory prototype of an apparatus for ultrasonic beams visualisation was constructed.

Due to the interest expressed by some external firms for this relatively simple and cheap characterization technique of ultrasonic instrumentation, a "know-how" licencing contract was signed in 1979 with a Dutch firm.

A first industrial prototype was constructed in 1980 and it will be presented at INNOVA (Paris, April 81). This prototype was designed taking into account three principal criteria:

— high sensitivity,
— simplicity of use,
— low cost.

Simplified ultrasonic transducers

Ultrasonic techniques are currently widely used in two major research areas of the JRC: reactor safety and fissile materials control. New types of simplified transducers were developed and they are presently manufactured according several peculiar characteristics:

— the use of a special resin permits contacts on the two faces without welding and metallisation,
— the damping and the acoustical lens are made according predetermined characteristics.

Practical applications of this new transducer are under consideration.

High precision furnace (fig. 1)

A detailed investigation was made of a furnace for high temperatures, which is based on a gas-controlled sodium heat pipe. At 850°C temperature variations of less than $\pm$ 0.005°C were observed over a zone more than 30 cm long. Very short transition times between different temperature levels were found. In a 10°C change, for example, the new equilibrium is reached within 1.5×10^{-3}°C after less than 3 minutes. From the measured results it is concluded that gas controlled heat pipe furnaces offer unique possibilities with regard to the obtainable temperature homogeneity, the stability and reproducibility of the temperature level and the ease and fastness of transition from one temperature level to another.

An industrial prototype is being developed by a German firm, licensee of JRC patents in this field.

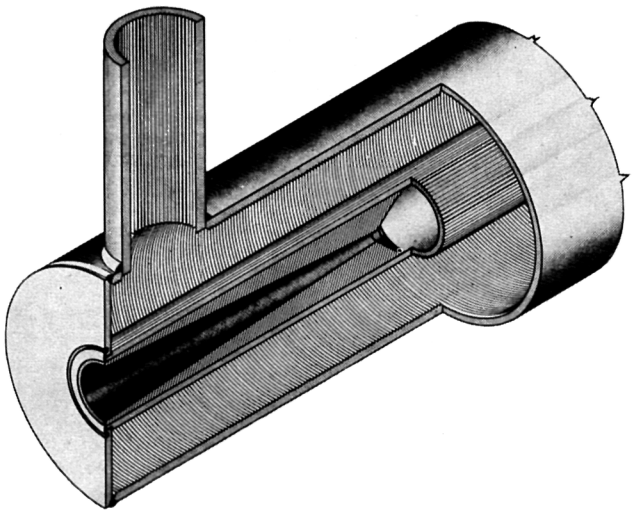

Fig. 1. Isometric view of the sodium heat pipe furnace

Gridded ionisation chamber (fig. 2)

A two grids ionization chamber for the study of the ionization process by alpha rays in gases has been designed. Particular attention has been given to the vacuum system (a quadrupole analyzer will measure on line the mass spectrum in the chamber) and to the low-noise electronic chain.

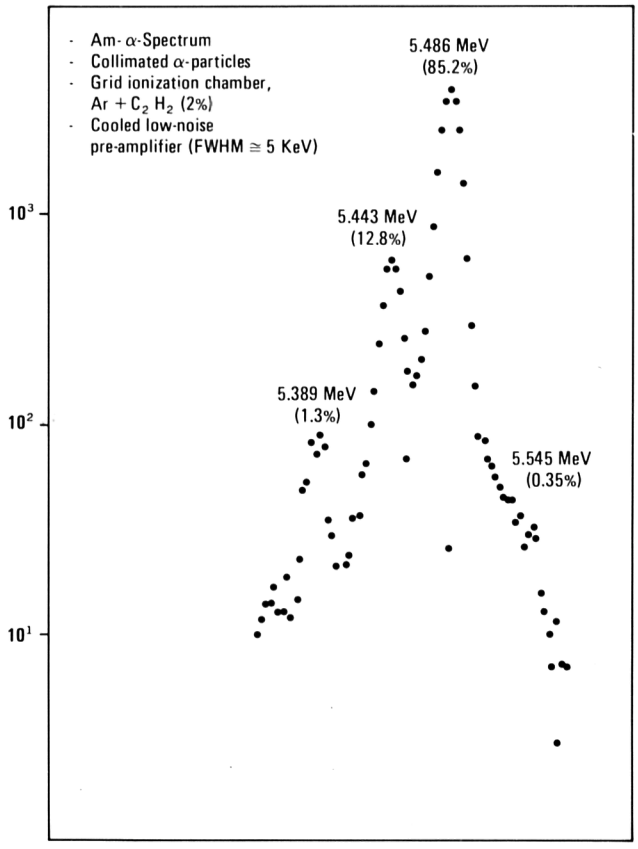

Fig. 2. Typical spectrum of the gridded ionization chamber

The aim is to measure:

— the fluctuation of the ionization produced by alpha-particles in gas mixtures,

— the effect of the angle of emission of the particle on the energy resolution.

Applications are foreseen for Health Physics and Fissile Materials Control.

Absolute viscosimeter

Consistent steps forward were made in the construction of an absolute viscosimeter, aimed to instruments calibration.
The thermostatic system (heat pipe concept) is currently working in the 20°C - 60°C range with temperature deviations well below ± 0.01°C.
By means of an over-flow vessel modified design, disturbing oscillation of the liquid meniscus were eliminated. The results of the second intercomparison were discussed in September at Brussels by the Experts Group Viscosity.

Removal of sulphur dioxyde from waste gases (fig. 3)

A laboratory prototype was constructed to test a process developed at JRC as fall-out of research activities related to Hydrogen Production Programme.

The advantage of the new process over the current commercial desulphurisation processes are:

— the generation of two valuable chemical products, hydrogen and sulphuric acid (90 wt %) instead of the production of large amounts of valueless sludge,.

— only liquids are involved, i.e. no fouling, filtration, and crustation occur in the process,

— process design is very simple, and, consequently, cheap,

— consumption of chemicals is very small.

AC motors control

Seeking better instrumentation, JRC developed an original system which permits modulation of both amplitude and frequence within a quite large range of values.
This system permits speed regulation of AC motors, thus avoiding heating and couple losses. Key element of this patent deals with the control of the sinusoidal tension by means of a microprocessor.
Two industrial prototypes were developed under patent licence by a French firm: two different modular versions were presented first at INTERKAMA, in September 1980.

Carving massive metal pieces by electroerosion

This process permits the realisation of a wide variety of cavity forms in massive metal pieces by means of externally driven electrocrosion electrodes. Progresses were dealing with improved reliability of the driving system and with the miniaturisation of the whole process (cavities as large as 200 mm were eroded through an entering hole of 7.5 mm).

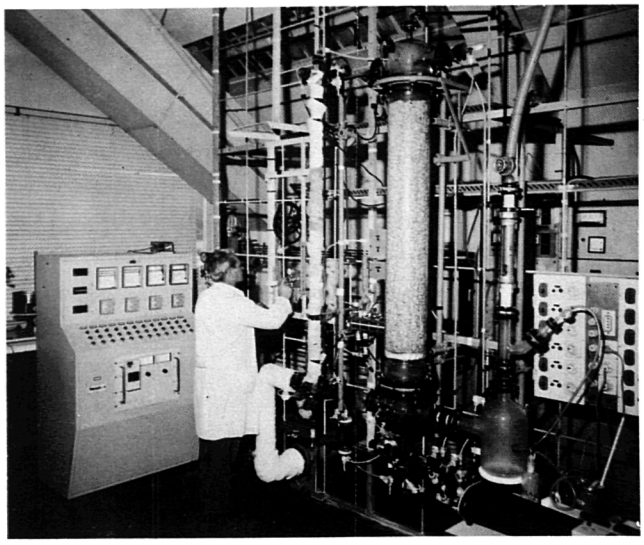

Fig. 3. Bench-scale plant for sulphur dioxide removal from water gases

Fig. 4. The italian Minister for Scientific Research, V. SCALIA (first right), visiting the JRC stand at the 27th R.I.E.N.A. - Rome March 7th to 16th 80

A licence agreement was signed with an Italian firm on this process.

Alluminium-Calcium superplastic alloys

A new aluminium-calcium superplastic alloy was developed and patented by JRC scientists in past years: a licence agreement was recently settled with a British firm.
Two aspects were recognized by the Licensee to be of practical importance for industrial exploitation and marketing:

— to improve room temperature ductility,
— to characterize corrosion behaviour.

These investigations were successfully carried out (partly under contract), thus leading to practical recommendation on both heat and surface treatments.

Solar paints

Coating of solar collectors is a wide used technique aimed to maximize heat absorption and to minimize emittence of infrared radiation. The paint developed at JRC Ispra (trade mark HELIONERO) does have peculiar characteristics:

— it can be deposited on any metal base material by conventional spraying and subsequent air or oven hardening,
— it has very high absorption coefficient (≥ 0.96) and reduced infrared emissivity (≤ 0.7).
— it presents good resistance to ultraviolet light and to atmospheric corrosion.

Full characterisation and ageing tests were performed in support to an Italian firm, licensee on JRC patents.

General information (fig. 4)

On March 7th to 16th, 1980, the JRC participated to the "27th International Exhibition of Electronics, Nuclear Energy and Aerospace Technologies" at Rome (Italy). On a surface of approximately 200 m², JRC activities in the following areas were presented:

— Fissile materials control and management,
— Hydrogen production,
— Nuclear measurements,
— Reactor Safety,
— Remote sensing from space,
— Solar energy,
— Technology transfer (in cooperation with D.G. XIII),
— Training and education.

3. CONCLUSIONS

Although somewhat delayed by the late approval of 1980 budget, prospects of development for this new JRC programme look good. Of course, patents and licences were part of normal JRC activity since its origin: the new feature of this programme is that through an increased JRC activity in this field as well as a structured support to D.G. XIII, the process of utilization can be started at an earlier stage, with the deliberate purpose of achieving practical results as early as possible, through an adequate R&D effort.

Key element of this process is the systematic identification, within JRC programme, of those research areas, concepts, ideas, that might present interest for industry and for the public sector. In this respect, D.G. XIII by its market survey and contacts with industry is providing JRC with the essential information to carry out this programme.

For further information concerning the JRC programmes, please contact the Directorate General of JRC, rue de la Loi, 200, B - 1049 BRUSSELS (Belgium)

Salgs- og abonnementskontorer · Vertriebsbüros · Sales Offices Bureaux de vente · Uffici di vendita · Verkoopkantoren

Belgique - België

Moniteur belge – Belgisch Staatsblad

Rue de Louvain 40-42 –
Leuvensestraat 40-42
1000 Bruxelles – 1000 Brussel
Tél. 512 00 26
CCP 000-2005502-27
Postrekening 000-2005502-27

Sous-dépôts – Agentschappen:

Librairie européenne – Europese Boekhandel
Rue de la Loi 244 – Wetstraat 244
1040 Bruxelles – 1040 Brussel

CREDOC

Rue de la Montagne 34 - Bte 11 –
Bergstraat 34 - Bus 11
1000 Bruxelles – 1000 Brussel

Danmark

J.H. Schultz – Boghandel

Møntergade 19
1116 København K
Tlf. (01) 14 11 95
Girokonto 200 1195

Underagentur:

Europa Bøger
Gammel Torv 6
Postbox 137
1004 København K
Tlf. (01) 14 54 32

BR Deutschland

Verlag Bundesanzeiger

Breite Straße – Postfach 10 80 06
5000 Köln 1
Tel. (0221) 21 03 48
(Fernsc reiber: Anzeiger Bonn 8 882 595)
Postscheckkonto 834 00 Köln

France

Service de vente en France des publications des Communautés européennes

Journal officiel

26, rue Desaix
75732 Paris Cedex 15
Tél. (1) 578 61 39 – CCP Paris 23-96

Sous-dépôt

D.E.P.P.
Maison de l'Europe
37, rue des Francs-Bourgeois
75004 Paris
Tél. 887 96 50

Ireland

Government Publications

Sales Office
G.P.O. Arcade
Dublin 1

or by post from

Stationery Office

Dublin 4
Tel. 78 96 44

Italia

Libreria dello Stato

Piazza G. Verdi 10
00198 Roma – Tel. (6) 8508
Telex 62008
CCP 387001

Agenzia

Via XX Settembre
(Palazzo Ministero del tesoro)
00187 Roma

Grand-Duché de Luxembourg

Office des publications officielles des Communautés européennes

5, rue du Commerce
Boîte postale 1003 – Luxembourg
Tél. 49 00 81 – CCP 19190-81
Compte courant bancaire:
BIL 8-109/6003/300

Nederland

Staatsdrukkerij- en uitgeverijbedrijf

Christoffel Plantijnstraat, 's-Gravenhage
Tel. (070) 62 45 51
Postgiro 42 53 00

United Kingdom

H.M. Stationery Office

P.O. Box 569
London SE1 9NH
Tel. (01) 928 69 77, ext. 365
National Giro Account 582-1002

United States of America

European Community Information Service

2100 M Street, N.W.
Suite 707
Washington, D.C. 20 037
Tel. (202) 862 95 00

Schweiz - Suisse - Svizzera

Librairie Payot

6, rue Grenus
1211 Genève
Tél. 31 89 50
CCP 12-236 Genève

Sverige

Librairie C.E. Fritze

2, Fredsgatan
Stockholm 16
Postgiro 193, Bankgiro 73/4015

España

Libreria Mundi-Prensa

Castelló 37
Madrid 1
Tel. 275 46 55

Andre lande · Andere Länder · Other countries · Autres pays · Altri paesi · Andere landen

Kontoret for De europæiske Fællesskabers officielle Publikationer · Amt für amtliche Veröffentlichungen der Europäischen Gemeinschaften · Office for Official Publications of the European Communities · Office des publications officielles des Communautés européennes · Ufficio delle pubblicazioni ufficiali delle Comunità europee · Bureau voor officiële publikaties der Europese Gemeenschappen

Luxembourg 5, rue du Commerce Boîte postale 1003 Tél. 49 00 81 · CCP 19 190-81 Compte courant bancaire BIL 8-109/6003/300

NOTICE TO THE READER

All scientific and technical reports published by the Commission of the European Communities are announced in the monthly periodical '**euro-abstracts**'. For subscription (1 year : BFR 1.500) please write to the address below.

Utilization of research results 1980

ECU	BFR.	UKL	IR	USD.
3.60	150	2	2.50	4.30

OFFICE FOR OFFICIAL PUBLICATIONS
OF THE EUROPEAN COMMUNITIES

ISBN 92-825-2351-9

Boîte postale 1003 - Luxembourg

CDNA07262ENC